Citation:

Alvarez-León EE, Román-Viñas B, Serra-Majem L. Dairy products and health: A review of the epidemiological evidence. *Br J Nutr.* 2006; 96 Suppl 1: S94-S99.

PubMed ID: 16923261

Study Design:

Meta-analysis or Systematic Review

Class:

M - Click here for explanation of classification scheme.

Research Design and Implementation Rating:

POSITIVE: See Research Design and Implementation Criteria Checklist below.

Research Purpose:

- To review papers covering dairy products in both health promotion and disease prevention
- Focus was placed on the critical analysis of the scientific literature, pointing out future needs in the research for evidence between dairy products and health.

Inclusion Criteria:

- Relevant articles were obtained through searching the MEDLINE database (from 1966 to January 2005)
- Keywords used in this search were the MeSH term 'dairy products', defined as 'raw and processed or manufactured milk and milk-derived products' that included the following products: Butter, cheese, ice cream, margarine, milk and cultured milk products (yoghurt) and some health conditions
- The selection of health conditions was carried out on the basis of their public health importance (prevalence and severity) and included neoplasms, CVD (myocardial infarction, hypertension or cerebrovascular accident) and osteoporosis or bones.
- The MEDLINE search was complemented with the automatic PubMed clinical queries strategy, which combined 'dairy products' search with citations identified as systematic reviews, meta-analyses, reviews of clinical trials, evidence-based medicine, consensus development conferences and guidelines
- Citations from journals specializing in clinical review studies were also included
- To be eligible, works had to fulfill the following criteria: Abstract must be available, be written in Spanish, English or French and cover human population. Priority was given to meta-analysis and systematic reviews
- Evidence from epidemiological studies of dairy products and health was summarized
- To evaluate the strength of the evidence, validity and accuracy were taken into account. Validity was assessed by analyzing the presence of possible systematic bias in the design or execution of the studies. Accuracy was assessed by considering the size of the sample and the wideness of the confidence intervals.

Exclusion Criteria:

Not stated.

Description of Study Protocol:

Design

Systematic review.

Data Collection Summary:

Timing of Measurements

Not applicable.

Description of Actual Data Sample:

- *Initial N:* 85,000 articles
- At*trition:* 14 meta-analyses or systematic reviews
  - Six on dairy products and cancer [six meta-analyses and one systematic review on colorectal (one), breast (three) and prostate (three) cancer]
  - Six on dairy products and cardiovascular disease (on hypertension, stroke, and heart disease)
  - Two on dairy products and bone health (two systematic reviews).

Summary of Results:

- *Colorectal cancer:* Based on one meta-analysis, milk and calcium intake were associated with a lower risk of colorectal cancer. Compared with participants who consumed less than 70g of milk daily, the relative risk (RR) for colorectal cancer was 0·85 (95% CI: 0.78, 0.94) for those who consumed 250g per d or more. Subjects who consumed 25g or more of cottage or ricotta cheese daily had a RR of 0.83 (95% CI: 0.72, 0.96) of colorectal cancer, compared with those who did not consume cottage or ricotta cheese. Subjects in the highest quintile of dietary Ca intake had RR of 0.86 (95% CI: 0.78, 0.95) of colorectal cancer, compared with subjects in the lowest quintile. For total Ca (combining dietary and supplemental sources), the RR of the highest quintile was 0.78 (95% CI: 0.69, 0.88)
- Bre*ast cancer:* Based on three review papers, there appears to be no relationship between dairy product intake and breast cancer risk
- *Prostate cancer:* Of three review papers, two found a positive relationship between dairy consumption and prostate cancer, and one found an equal number of papers that showed negative and positive relationships between dairy and prostate cancer. The authors note that there are serious methodological issues with a number of the studies done on this topic, and that a meta-analysis developed with cohort studies or an intervention study would help clarify the issue further with regards to confounding caused by total fat intake.
- *Dairy products and osteoporosis and bone health:* Based on two review papers, the

association between dairy consumption and bone health is unclear
- *Dairy products and hypertension:* Low-fat dairy products may reduce hypertension due to the inherent intake of low sodium and adequate intakes of Ca, Mg and K
- *Dairy products and stroke:* Higher intake of dairy products was associated with lower risk of cerebrovascular accident or stroke
- *Dairy products and heart diseases:* A cohort study review showed that incident heart disease (IHD) was inversely related with milk intake. A pooled estimate of the relative odds for IHD in the subjects with the highest milk intakes was 0.87 (95% CI: 0.74, 1.03), compared with those with the lowest intakes. Authors also calculated a pooled estimate of the odds of stroke, that was 0.83 (95% CI: 0.77, 0.90) for the same subjects. Milk consumption was not associated with any increased risk of heart disease or stroke.

Other Findings

The authors identify a number of methodological issues to consider when reviewing the literature on dairy product consumption and health, including:

- Dietary recall methodology utilized
- Accounting for wide variation in the average intake of dairy products between different countries and populations
- Variation in dairy product nutrient content among different countries and regions
- Consideration of all dietary and non-dietary variables that could influence the disease risk
- Controlling or adjusting for total energy intake
- Evaluating the effects of study length on outcomes
- Analysis of overall dietary patterns and food consumption to establish adequate recommendations.

Author Conclusion:

- There is an inverse association between the intake of dairy products and hypertension, stroke and colorectal cancer
- There is no evidence of an association between the consumption of dairy products and breast cancer
- There is some evidence linking high fat dairy products and an incremental risk of prostate cancer and weak evidence of the protective capacity of dairy products on bone health.

Reviewer Comments:

Research Design and Implementation Criteria Checklist: Review Articles

Relevance Questions

1.	Will the answer if true, have a direct bearing on the health of patients?	Yes
2.	Is the outcome or topic something that patients/clients/population groups would care about?	Yes
3.	Is the problem addressed in the review one that is relevant to nutrition or dietetics practice?	Yes

4.	Will the information, if true, require a change in practice?	No

Validity Questions

1.	Was the question for the review clearly focused and appropriate?	Yes
2.	Was the search strategy used to locate relevant studies comprehensive? Were the databases searched and the search termsused described?	Yes
3.	Were explicit methods used to select studies to include in the review? Were inclusion/exclusion criteria specified and appropriate? Were selection methods unbiased?	Yes
4.	Was there an appraisal of the quality and validity of studies included in the review? Were appraisal methods specified, appropriate, and reproducible?	Yes
5.	Were specific treatments/interventions/exposures described? Were treatments similar enough to be combined?	Yes
6.	Was the outcome of interest clearly indicated? Were other potential harms and benefits considered?	Yes
7.	Were processes for data abstraction, synthesis, and analysis described? Were they applied consistently across studies and groups? Was there appropriate use of qualitative and/or quantitative synthesis? Was variation in findings among studies analyzed? Were heterogeneity issued considered? If data from studies were aggregated for meta-analysis, was the procedure described?	No
8.	Are the results clearly presented in narrative and/or quantitative terms? If summary statistics are used, are levels of significance and/or confidence intervals included?	Yes
9.	Are conclusions supported by results with biases and limitations taken into consideration? Are limitations of the review identified and discussed?	Yes
10.	Was bias due to the review's funding or sponsorship unlikely?	No